

## **MOEX Trading and Clearing Systems Load Testing plan for 21 March 2020**

### **Infrastructure**

#### **Markets**

During the load testing all MOEX Trading Systems will be tested, with the following maximum number of orders per market are to be reached:

- Securities market (ASTS system) – 70 000 000
- FX market (ASTS system) – 70 000 000
- Derivatives market (Spectra system) – 120 000 000

The aim of this testing is to provide participants with an opportunity to check their infrastructure and software at peak transaction frequency and with increased number of orders.

Total load testing run time – 3 hours. Target numbers of orders for every market 1.5-2 times exceed the maximum numbers achieved in real trading.

It is planned that transaction frequency during the tests will exceed the real market frequencies by 3-4 times on one second intervals, but at the same time the frequency will be below the maximum system performance capacity.

The maximum performance capacity of trading and clearing engines and all the subsystems will be measured during the short interval at the end of the tests to avoid the distortion of measurements caused by transaction queues.

In order to create realistic environment it is recommended to all participants to connect all the external systems that are used during the normal trading to the ASTS system and all the external system for all connectivity protocols (Plaza2/CGate, FIX/FAST, TWIME) to the Spectra system.

### Details of testing procedure

For Spectra trading system current production connectivity addresses will be used. In order to receive realistic measurements it is recommended to use connectivity points in main data center (DSP).

### Services

The following services and subsystems will be up and running during the tests:

- Index Servers
- Web services

## Requirements to the infrastructure of participants

### Network

In order to reach the maximum planned intensity of transactions and FAST udp multicast marketdata feed the following bandwidth requirements should be met per every channel:

- Securities market – 1 Mbit/s bandwidth per each ASTS Bridge API information request cycle and each trading terminal
- FX market – 1 Mbit/s bandwidth per each ASTS Bridge API information request cycle and each trading terminal
- Derivatives market – 10 Mbit/s
- FIX udp multicast for Securities market (feed A) – 60 Mbit/s
- FIX udp multicast for FX market (feed A) – 60 Mbit/s
- FIX udp multicast for Derivatives market aggregated book (feed A) – 5 Mbit/s
- FIX udp multicast for Derivatives market full order log (feed A) – 50 Mbit/s

**Note:** only those clients who use leased lines with bandwidth higher than sum of requirement for every copy of services, given above, should expect their Gateways to run normally at the expected peak frequencies.

Clients with smaller bandwidth will witness the slippage of Gateways or FAST packets lost once 100% of the channel bandwidth becomes occupied by the replication traffic.

## Load Testing Scenario

Participants may run their own scenarios but it is strongly recommended to adhere to the following principles in avoidance to create artificial deterioration of Trading System capacity:

- To comply with the real trading statistics withdraw 99% of orders or more by order number.
- Try not to conclude too many trades. Otherwise tests may stop when the maximum trade number is reached while the maximum order number is not.
- We strongly recommend to participants to analyze market parameters for instruments during load testing for minimizing quantity of transactions that would be rejected due to non-market price range.

MOEX team may suspend user accounts in case if malicious activity that interferes with load testing is detected.

## Load Testing Schedule

Tentative start time – 12:00 MSK, end of test – 15:00 MSK

Numbers for peak frequencies are approximate.

Event	Duration, minutes	Event start time	FX Market, transaction /sec	Securities Market, transaction /sec	Derivatives Market, transaction /sec	FX Market, orders	Securities Market, orders	Derivatives Market, orders
<b>Start</b>	30	0	0	0	0	0	0	0
<b>Opening auction</b>	10	30	0	200	0	0	120000	0
<b>3000</b>	20	40	3 000	3000	3 000	2 400 000	2 520 000	2 400 000
<b>10000</b>	5	60	10 000	10 000	10 000	4 400 000	4 520 000	4 400 000
<b>15000</b>	5	65	15 000	15 000	15 000	7 400 000	7 520 000	7 400 000
<b>30000</b>	10	70	30 000	30 000	30 000	19 400 000	19 520 000	19 400 000
<b>Intermediate Clearing of Derivatives Market</b>	20	80	8 000	8 000		23 400 000	23 520 000	19 400 000
<b>8000</b>	40	100	8 000	8 000	8 000	36 200 000	36 320 000	32 200 000
<b>Maximum</b>	30	140	TBM	TBM	TBM	70 000 000	70 000 000	120 000 000
<b>Stop load</b>	0	170	0	0	0	70 000 000	70 000 000	120 000 000
<b>Stop</b>		180						
<b>Internal testing without participants</b>	120	190						

12:00

15:00